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10/599,418	09/28/2006	Zhongmin Steve Lin	PHUS040183US3	6123

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS
595 MINER ROAD
CLEVELAND, OH 44143

EXAMINER	
SANEI, MONA M	

ART UNIT	PAPER NUMBER
2882	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/599,418	LIN, ZHONGMIN STEVE	
	Examiner	Art Unit	
	MONA M. SANEI	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 December 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4-7,9,10,12,14-17 and 21-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *14-16* is/are allowed.

6)☒ Claim(s) *4-7,9,10,12 and 21-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 4-7, 9, 10, 12, 17, and 21-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- In claim 5, lines 13-14, the phrase "an estimated attenuation of radiation" is indefinite insofar as it is unclear whether the phrase is referring to a new attenuation of radiation or to the "attenuation of radiation" recited in line 8 of the claim.
- In claim 5, lines 19-20, the phrase "the estimated attenuation of radiation" lacks proper antecedent basis insofar as it is unclear whether the phrase is referring to the "attenuation of radiation" recited in line 8 of the claim or to the "estimated attenuation of radiation" recited in lines 13-14 of the claim.
- In claim 11, line 2, the phrase "an x-ray current" is indefinite insofar as it is unclear whether the phrase is referring to a new x-ray current or to the "x-ray current" of parent claim 21, line 11.
- In claim 11, line 3, the phrase "the x-ray current" lacks proper antecedent basis insofar as it is unclear whether the phrase is referring to the "x-ray current" of parent claim 21, line 11 or to the "x-ray current" of claim 11, line 2.
- In claim 21, lines 9-10, the phrase "acquired over a preceding at least one revolution of the helical orbit previous to the current position" is indefinite insofar as the phrase is unclear.

- Claim 22 is indefinite insofar as it is unclear how "acquiring" could comprise "revolving the x-ray source around the subject and simultaneously linearly moving the subject such that the revolving and linear moving cooperatively define the helical orbit of the x-ray source relative to a subject".
- In claim 23, line 2, the phrase "x-ray current" is indefinite insofar as it is unclear whether the phrase is referring to a new x-ray current or to the "x-ray current" of parent claim 21, line 11.
- In claim 23, line 3, the phrase "radiation attenuation" lacks proper antecedent basis insofar as it is unclear whether the limitation is referring to the "axial radiation attenuation" of parent claim 21, line 5 or to the "baseline radiation attenuation" of parent claim 21, line 8.
- In claim 23, lines 4-5, "the acquiring operation" lacks proper antecedent basis.
- In claim 23, line 5, the phrase "the x-ray current" lacks proper antecedent basis insofar as it is unclear whether the phrase is referring to the "x-ray current" of parent claim 21, line 11 or to the "x-ray current" of claim 23, line 2.
- Claims 4, 6, 7, 9, 10, 12, and 17 are rejected by virtue of their dependencies.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 4, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kalender et al. (Dose reduction in CT by anatomically adapted tube current modulation. II. Phantom measurements; 1999; Medical Physics; 26(11)) in view of Popescu et al. (US 5867555).

- Regarding claim 21, Kalender et al. teaches a method comprising:

acquiring CT imaging data as an x-ray source traverses a helical orbit relative to a subject (pg. 2248, col. 1, lines 1-12; pg. 2248, col. 2, lines 18-20; see figure 1);

determining an axial radiation attenuation from CT imaging data acquired previously at a point in the helical orbit about a half revolution away from a current position of the x-ray source (pg. 2248, col. 1, line 9-col. 2, line 20; see figure 1);

modulating an x-ray current of the x-ray source at the current position of the x-ray source based on the determined axial radiation attenuation (pg. 2248, col. 1, line 13-col. 2, line 20; see figure 1).

However, Kalender et al. fails to teach determining a baseline radiation attenuation from CT imaging data acquired over a preceding at least one revolution of the helical orbit previous to the current position of the x-ray source and modulating the x-ray current of the x-ray source at the current position of the x-ray source based on the determined baseline radiation attenuation.

Popescu et al. teaches determining a baseline radiation attenuation ("modulation index", col. 3, line 67 – col. 4, line 1) from CT imaging data acquired over a preceding at least one revolution of a helical orbit previous to a current position of an x-ray source (col. 1, lines 39-43; col. 3, lines 6-21; and col. 3, lines 58-62; see figure 4) and modulating an x-ray current of the x-ray source at the current position of the x-ray source based on the determined baseline radiation attenuation (col. 2, lines 42-54; see figure 4).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the method of Kalender et al. to also include the feature suggested by Pepescu et al. since one would have been motivated to make such a modification to to provide a

method which allows for a faster calculation of the attenuation during a scan (col. 2, lines 38-40) as implied by Popescu et al.

- Regarding claim 4, Kalender et al. teaches a CT scanner including a processor programmed to perform a method according to claim 21 (see figure 1).
- Regarding claim 22, Popescu et al. teaches that the helical orbit is defined by revolving the x-ray source around the subject and simultaneously linearly moving the subject (col. 1, lines 39-43).
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3. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kalender et al. (Dose reduction in CT by anatomically adapted tube current modulation. II. Phantom measurements; 1999; Medical Physics; 26(11)) in view of Popescu et al. (US 5867555) as applied to claim 21 above, and further in view of Gies et al. (Dose reduction in CT by anatomically adapted tube current modulation. I. Simulation studies; 1999; Medical Physics; 26(11)).

- Regarding claim 11, Kalender et al. as modified above suggests a method as recited above.

However, Kalender et al. fails to teach that the modulating of the x-ray current includes modulating the x-ray current based on the determined axial and determined baseline radiation attenuation raised to a selected power, respectively.

Gies et al. teaches that modulating of an x-ray current includes modulating the x-ray tube current base on a determined radiation attenuation raised to a selected power (pg. 2235, col. 2, second paragraph; pg. 2236, col. 2, last paragraph – pg. 2237, col. 1, first paragraph).

It would have been obvious to one having ordinary skill in the art at the time of the invention to further modify the method of Kalender et al. to also include the feature suggested by since one would have been motivated to make such a modification to provide tube current control which yields the optimal pixel noise level for a given total dose (pg. 2237, col. 1, last paragraph – pg. 2237, col. 2, line 1) as implied by Gies et al.

Allowable Subject Matter

4. Claims 14-16 are allowed.

The following is an examiner's statement of reasons for allowance:

° Regarding claim 14, the prior art fails to teach or fairly suggests a method requiring the step of determining a baseline x-ray current component based on a ratio of an estimated baseline attenuation of an upcoming position or angular bin and an average attenuation of the initial revolution, determining an axial current component based on a ratio of an estimated axial attenuation of the upcoming position or angular bin and a maximum or average attenuation of a present revolution, and determining a total x-ray current by combining the baseline and axial x-ray current components, in combination with all the other limitations of the claim.

° Claims 15 and 16 are allowable by virtue of their dependencies.

Response to Arguments

5. Applicant's arguments filed December 15, 2008 have been fully considered but they are not persuasive.

° Regarding claim 21, applicant asserts that the "modulation index" of Popescu et al. (US 5867555) does not correspond to the baseline radiation attenuation recited in claim 21. Examiner respectfully disagrees. Popescu et al. teaches that the modulation index is a moving

average over a measured attenuation profile (col. 3, line 63-col. 4, line 14). Applicant's specification teaches that the baseline radiation attenuation is an average over a measured attenuation profile (page 13, lines 12-28). Therefore, Examiner takes the position that Popescu et al.'s modulation index does correspond to applicant's baseline radiation attenuation recited in claim 21. For these reasons, applicant's arguments are not persuasive and the rejection is being maintained.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MONA M. SANEI whose telephone number is (571)272-8657. The examiner can normally be reached on M-W 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mona M Sanei/
Examiner, Art Unit 2882

/Edward J Glick/
Supervisory Patent Examiner, Art Unit 2882